

Research Article

GROUP DISCUSSION AS INTERACTIVE DIALOGUE OR AS SERIAL MONOLOGUE: The Influence of Group Size

Nicolas Fay,¹ Simon Garrod,¹ and Jean Carletta²

¹University of Glasgow, Glasgow, Scotland, and ²University of Edinburgh, Edinburgh, Scotland

Abstract—*Current models draw a broad distinction between communication as dialogue and communication as monologue. The two kinds of models have different implications for who influences whom in a group discussion. If the discussion is like interactive dialogue, group members should be influenced most by those with whom they interact in the discussion; if it is like serial monologue, they should be influenced most by the dominant speaker. The experiments reported here show that in small, 5-person groups, the communication is like dialogue and members are influenced most by those with whom they interact in the discussion. However, in large, 10-person groups, the communication is like monologue and members are influenced most by the dominant speaker. The difference in mode of communication is explained in terms of how speakers in the two sizes of groups design their utterances for different audiences.*

Everyday communication commonly takes place in groups. Whether in the workplace or in the home, many, if not most, complex decisions are made through such group discussions (Dunbar, 1996). This article addresses the question of how the size of the group influences the communication and decision process.

Imagine that you are a member of a university disciplinary committee that has just met to discuss a case of student plagiarism and to formulate recommendations for dealing with such cases in the future. As the meeting proceeds, there are times when you find yourself engaged in close interactive discussions with just a few people on the committee. At other times, you find yourself sitting back and listening to a dominant speaker who seems to control what is happening in the meeting. How do these different kinds of communicative behavior affect your view of what was said and agreed upon in the meeting? After all, it is a common experience that after such meetings you discover other members of the committee have a slightly different view of what happened. They might consider the extent of the plagiarism to have been the key issue in the discussion; you might consider the previous record of the student to have been the main point. Are your views influenced most by those with whom you interacted directly, or are they influenced more by what the dominant speaker said?

Current models of communication differ on this issue. One views communication as dialogue, the other views communication as monologue (Krauss & Fussell, 1996). The two kinds of models make interestingly different predictions as to how group members might influence each other's beliefs about what happened in such a meeting. The dialogue model assumes that communication takes place between pairs engaged in a tightly coupled collaborative process aimed at establishing a mutual understanding of what is being discussed (Clark,

1985, 1996; Garrod & Anderson, 1987; Garrod & Doherty, 1994). Thus, Schober and Clark (1989) have demonstrated that people who overhear a two-party dialogue understand much less of what is communicated than the people actively engaged in the dialogue. If group discussion operates in this way, then group members should be influenced most by those with whom they interact. Therefore, members' views about what happened at the meeting should tend to agree with the views of those with whom they interacted, and not be especially influenced by those, including a dominant speaker, whom they overheard.

Consider now the monologue model. This model assumes that communication takes place between a sender and a receiver who process the language signal autonomously (Cherry, 1956). As a meeting proceeds, one speaker after another will hold the floor. Each speaker (i.e., the sender) broadcasts his or her message to all the other members of the group (i.e., the receivers). Those who speak the most at the meeting broadcast the most information to the rest of the group. Therefore, according to the monologue model, group members' views about what was important in their discussion should be influenced more by dominant speakers, who said the most, than by nondominant speakers, who said little in the discussion.

In this article, we consider the degree to which these predictions fit patterns of agreement about the importance of what was said during discussions among groups of different sizes. It has long been known that the size of a group affects the degree of interaction in the group (Hare, 1962). This is probably because of the rapidly increasing number of possible dyadic relationships as groups become larger and hence the participants' inability to maintain multiple dyadic communication channels (Steiner, 1972, p. 101). One consequence is that as groups enlarge, communication becomes less interactive: Two-party conversations become less frequent (Stasser & Taylor, 1991), and the amount contributed by each additional member to a discussion group decreases exponentially (Bales, Strodtbeck, Mills, & Roseborough, 1951; Stephan & Mishler, 1952). Thus, the majority of the speech in discussions involving 10 or more participants is produced by only the top 4 or 5 contributors. This is consistent with the finding that an ideal small interactive group should have about 5 members and that groups change in terms of their interaction and communication patterns as they approach a size of 10 (Hare, 1981, p. 697).

Given these observations about patterns of interaction and communication in small and large groups, we expected to find comparable effects with the patterns of influence during meetings held in such groups. In small groups of 5, if the dialogue model holds, members should agree most with those with whom they interacted in the discussion and not be especially influenced by the person who said the most. In large groups of 10, if the monologue model holds, members should tend to agree with the person who said the most and not be especially influenced by those with whom they interacted in the meeting. The first experiment was designed to test these predictions with groups discussing a student plagiarism case.

Address correspondence to Simon Garrod, Human Communication Research Centre, Department of Psychology, University of Glasgow, 56, Hillhead St., Glasgow G12 9YR, Scotland; e-mail: simon@psy.gla.ac.uk.

EXPERIMENT 1

Method

The participants were 150 undergraduates, each of whom was randomly assigned to a 5-member or 10-member group. There were 10 groups of each size. First, each participant read a one-page description of a scenario involving student plagiarism and then ranked 13 issues in terms of how important they were in relation to the case (the scenario and issues are shown in the appendix). The 13 issues had been identified in a pilot experiment as likely to emerge in discussion of the case. Some, such as the extent of the plagiarism, were very likely to emerge in any discussion, whereas others, such as the responsibility of the institution to the welfare of the student in the case, were likely to emerge in only some of the discussions.

Each group was then instructed to imagine that they were a committee of the university with the task of making general recommendations for how to deal with this and other cases of plagiarism. They were seated around a table, and it was suggested that they should take about 20 min to discuss the case. Once the group had completed its discussion, the participants were separated and required to rank the same 13 issues in relation to what was said and agreed upon during the group's discussion.

Recording, transcription, and coding of the discussions

The discussions were audio and video recorded. They were then transcribed to differentiate between dominant and nondominant speakers. The average proportion of words contributed by each speaker is plotted against speakers' rank order for the two sizes of groups in Figure 1. The figure illustrates the exponential decrease in words contributed as rank becomes lower for both sizes of groups. To take this pattern into account, we identified the dominant speaker for each group as the top-ranking contributor, whereas we identified the matching nondominant speaker as the 5th-ranking contributor for both groups of 5 and groups of 10. Thus, for each group, members were partitioned into one dominant speaker, one nondominant speaker, and the rest.

To differentiate between high-interaction partners and low-interaction partners, we coded the transcripts according to the sequence of speaker turns (Dabbs & Ruback, 1987). When there were

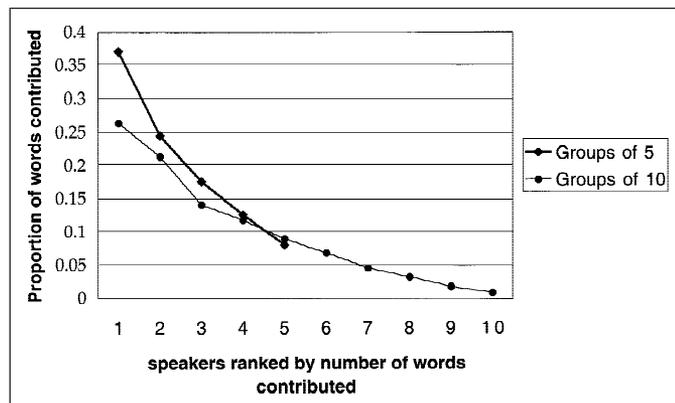


Fig. 1. Average proportion of words contributed as a function of the rank order of speakers in groups of 5 and groups of 10.

multiple starts, the successful turn was taken as the one that ran through to completion. As a check on the reliability of the coding, eight discussions (four from 5-person groups and four from 10-person groups) were independently coded by a second person. There was strong agreement between the coders for both speaker identification ($K = .89$, $k = 2$, $N = 1,413$) and decisions about the sequence of successful turns ($K = .93$, $k = 2$, $N = 2,579$).

High- and low-interaction partners were established for each member of a group on the basis of the relative number of adjacent turns in the discussion. In groups of 5, the 2 participants who shared the greatest number of adjacent turns with a given member were classified as that member's high-interaction partners ($M = 24.38$ adjacent turns), and the 2 who shared the smallest number of adjacent turns with that member were classified as his or her low-interaction partners ($M = 10$ adjacent turns). Because of the decrease in contributions for low-ranking members in the larger groups (see Fig. 1), high- and low-interaction partners were chosen only for the 5 highest contributors to the large-group discussions. In large groups, high-interaction partners had 11.7 adjacent turns and low-interaction partners had 1.67 adjacent turns, on average.

Analysis of the issue rankings in relation to group members' influence

To test our hypotheses, it was crucial to first establish the degree of prediscussion agreement as to the importance of the issues. In particular, we needed to take into account the possibility that high-interaction partners might have agreed more about the importance of issues than low-interaction partners prior to the discussion. We therefore correlated each group member's prediscussion rankings of the issues against those of his or her high- and low-interaction partners.

Similarly, we needed to take into account the possibility that prior to the discussion, dominant speakers might have agreed more with the rest of the group than nondominant speakers. We therefore also correlated the prediscussion rankings of dominant and nondominant speakers with the rankings of the rest of the group. The R values produced by these correlations were then transformed using Fisher's (1921) formula to yield normally distributed r' scores, which were used in the analyses we report.

We conducted two 2×2 mixed design analyses of variance on the prediscussion r' scores with group size as the between-subjects factor. The first analysis treated dyadic interaction (high vs. low) as a within-subjects factor, and the second treated dominance (dominant vs. nondominant) as a within-subjects factor. The first analysis revealed a main effect of dyadic interaction (high = .47, low = .41), $F(1, 98) = 9.23$, $MSE = 0.04$, but no interaction with group size ($p > .1$; for all results reported, the F s are reliable at the $p < .05$ level unless otherwise stated). The second analysis revealed a main effect of dominance (dominant = .49, nondominant = .40), $F(1, 108) = 6.33$, $MSE = 0.07$, but no interaction with group size ($p > .1$). To take these prediscussion biases into account, all our subsequent analyses of degree of influence reflected in postdiscussion rankings of the issues were carried out with the corresponding prediscussion levels factored out.

To establish the influence of dyadic interaction in the discussion itself, we correlated each member's postdiscussion rankings with those of his or her high- and low-interaction partners. To establish the influence of dominant as opposed to nondominant speakers in the discussion itself, we correlated the postdiscussion rankings of both the

dominant and the nondominant speakers with those from the rest of the group.

Results and Discussion

The pattern of results fit the predictions. In the small groups, members' postdiscussion rankings correlated most strongly with the rankings of group members with whom they had interacted in the meeting, and there was no effect of dominance. However, in the large groups, the opposite was the case.

First, we examine the results in relation to the predictions of the dialogue model, namely, that each member's view of the relative importance of the issues discussed should be influenced most by the people with whom the member interacted in the meeting. Figure 2 shows the mean correlation in postdiscussion rankings between group members and their high- and low-interaction partners, corrected for prediscussion levels of agreement. For comparison, the mean correlation in prediscussion rankings is also shown. It can be seen that for groups of 5, participants agreed more with those with whom they interacted the most, whereas for groups of 10, there was no difference between high- and low-interaction partners in their postdiscussion agreement.

The r' scores were entered into a 2×2 mixed design analysis of covariance (ANCOVA) with dyadic interaction as a within-subjects factor and group size as a between-subjects factor. The matching prediscussion r' values were entered as the covariate. The ANCOVA

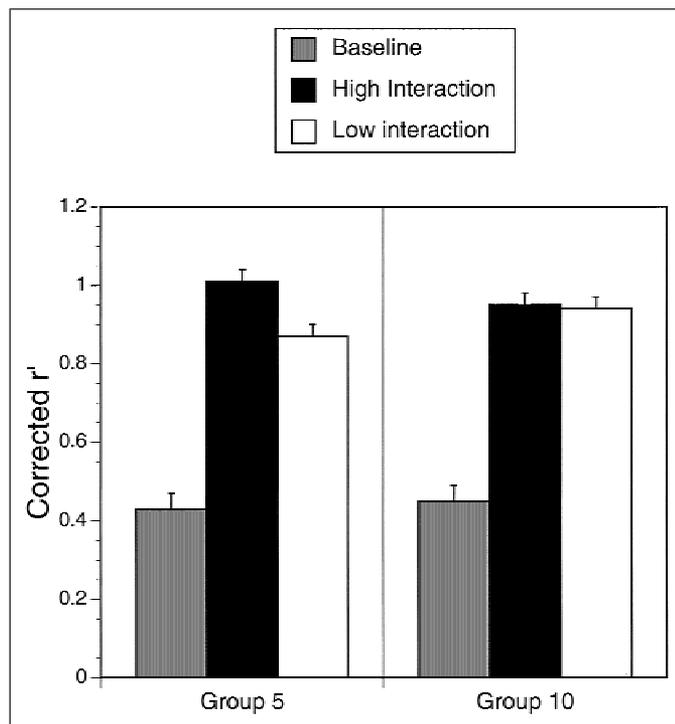


Fig. 2. Mean r' scores reflecting postdiscussion agreement on issue rankings between members of the group and their high- and low-interaction partners in Experiment 1. The r' scores are corrected for matched levels of prediscussion agreement, and the average prediscussion level is shown as a baseline. Results are shown separately for groups of 5 and groups of 10.

revealed a reliable main effect of dyadic interaction, $F(1, 97) = 6.13$, $MSE = 0.03$, and more important, a reliable interaction between group size and dyadic interaction, $F(1, 97) = 7.95$, $MSE = 0.03$. This was due to the simple effect of dyadic interaction in small groups, $F(1, 48) = 11.2$, with no such effect for the large groups ($F < 1$). An additional ANCOVA in which group was treated as a random effect produced exactly the same results (for all critical F s, $p < .05$). The analyses thus confirm the observation that in the small groups, the members were influenced most by those with whom they interacted the most, whereas there was no such effect for the larger groups.

We now turn to the predictions of the monologue model, namely, that group members should be influenced most by the person who said the most in the discussion. Figure 3 shows the level of pre- and postdiscussion agreement in the issue rankings between the dominant speaker and the other members of the group and between the nondominant speaker and the other members of the group. The matching prediscussion agreement is factored out. It can be seen that there is a higher correlation with the dominant as opposed to the nondominant speaker's rankings for groups of 10, but not for groups of 5.

The r' scores were analyzed in a mixed design 2×2 ANCOVA with dominance as a within-subjects factor and group size as a between-subjects factor. The matching prediscussion r' s were entered as the covariate. This analysis revealed a reliable main effect of dominance, $F(1, 107) = 3.61$, $MSE = 0.06$, and an interaction between speaker dominance and group size, $F(1, 107) = 7.82$, $MSE = 0.06$. This interaction was due to the effect of speaker dominance in groups of 10, $F(1, 78) = 16.86$, with no effect in groups of 5 ($F < 1$). Again, an additional ANCOVA in which group was treated as a random

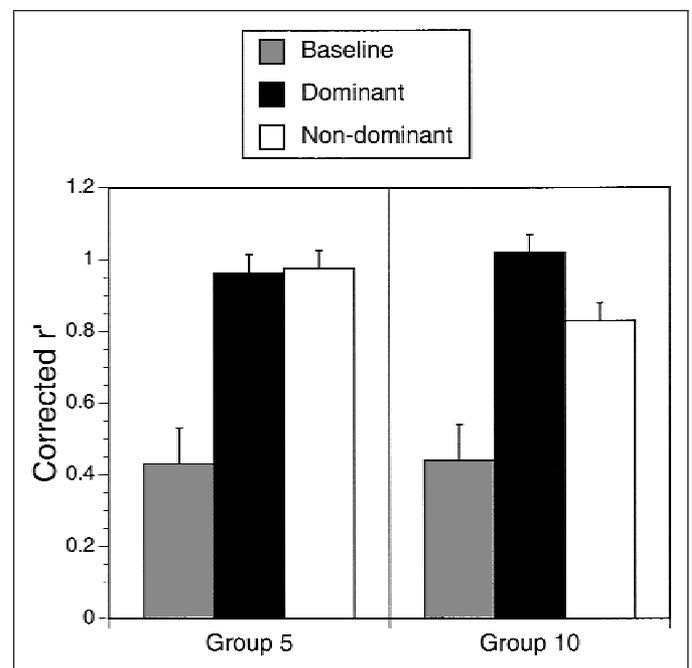


Fig. 3. Mean r' scores reflecting postdiscussion agreement on issue rankings between dominant speakers and the rest of the group and between nondominant speakers and the rest of the group in Experiment 1. The r' scores are corrected for matched levels of prediscussion agreement, and the average prediscussion level is shown as a baseline. Results are shown separately for groups of 5 and groups of 10.

Group Discussion

effect revealed an identical pattern of results (for all critical F s, $p < .05$). The analyses thus confirm the observation that dominant speakers had a disproportionate influence on the other group members only when the discussion was in large groups.

The results point to two different sources of interspeaker influence in the different-size groups, and these sources of influence are consistent with the two kinds of communication processes discussed in the introduction. In the small groups, the pattern of influence is what one would expect with a dialogue model, whereas in the large groups, the pattern of influence is what one would expect on the basis of the monologue model.

More detailed analyses of the transcripts support this distinction. One marker of pair-wise dialogue in groups is in the patterning of speaker turns. Parker (1988) showed that in 4-person group discussions, whenever speaker A is followed by speaker B, A is the most likely next speaker. He called the situation in which turns follow an ABA pattern a *floor state*. The more turns in a group discussion that are in floor states, the more the discussion is like a sequence of pair-wise conversations. For the groups tested here, there was a higher proportion of three-turn floor states in groups of 5 (observed = 42.2%, expected = 17%) than in groups of 10 (observed = 29.4%, expected = 12%). After correcting for chance, there is a greater proportion in groups of 5 than in groups of 10, $\chi^2(1, N = 1,209) = 11.08, p < .01$. This is consistent with a greater degree of pair-wise dialogue in the small groups than in the large groups.

A second feature of the data that suggests that the small-group discussions were more interactive than the large-group discussions comes from analysis of the proportion of interruptions and length of turns. In highly interactive two-party dialogues, turns tend to be interrupted before the speaker has finished what he or she wanted to say. This may be why people who overhear dialogues have so much trouble understanding what is being communicated (Schober & Clark, 1989). Thus, highly interactive group discussions should contain more interruptions, and hence shorter turns, than less interactive group discussions. On the basis of our group recordings, we established that 31% of turns in small groups were interrupted, as compared with 25% in the large groups, $\chi^2(1, N = 3,627) = 12.55, p < .01$. The small groups had more interruptions despite the increased number of potential interrupters in the larger groups. As a consequence of the increased proportion of interruptions, the small-group discussions also contained shorter turns (16.8 words per turn, compared with 22.0 words per turn in groups of 10), $t(18) = 4.6, p < .01$.

These additional observations about the patterning and length of speaker turns raise a question about the immediate cause of the over-hearer deficit reported for small groups (i.e., that members of small groups are influenced by the people with whom they interact but not by those, such as the dominant speaker, whose conversations they only overhear). One possibility is that participants in small groups, as opposed to those in large groups, attend only to the discussions in which they directly take part and so are not influenced especially by dominant speakers (Sacks, Schegloff, & Jefferson, 1974). This would attribute the over-hearer deficit to the listeners rather than the speakers in the group discussion. A second possibility is that listeners attend to everything that is said in both large and small groups, but that in the small groups they cannot properly understand the conversations in which they do not directly take part. This would attribute the effect to speakers and what has been called *audience design* (Clark & Murphy, 1982). The assumption is that in groups of 10, but not 5, speakers take

into account the broader audience and so design their utterances to be more understandable to that audience.

Experiment 2 was designed to differentiate between the two accounts of the over-hearer deficit by investigating the effects of small-group and large-group discussions on genuine overhearers (i.e., people who listened to tape recordings of the original discussions without having taken part in them). If the utterances in the large-group discussions were directed at the group as a whole and utterances in the small-group discussions were not, then genuine overhearers would be expected to show higher levels of agreement about what was said and agreed upon in the large-group discussions compared with the small-group discussions. Furthermore, they would be influenced more by the dominant speakers in the large groups than the dominant speakers in the small groups, because only in large-group discussions would overhearers properly understand what was being communicated.

EXPERIMENT 2

Method

One hundred participants listened to the discussions recorded in Experiment 1. Each participant overheard two discussions, one from each size group (with discussion length matched as closely as possible and order of presentation counterbalanced across the participants). Thus, for each 5-member and each 10-member discussion, there were 10 overhearers. The experimental procedure matched that of Experiment 1 as closely as possible. First, the participants read the one-page plagiarism scenario used in Experiment 1. Then, they each ranked the 13 issues in terms of their importance to that scenario before listening to the tape recording of the first discussion. After listening to the discussion, they reranked the issues in terms of how important they had been in that discussion. They were then given a short break before listening to the second discussion. Finally, they ranked the issues in terms of how important they had been in the second discussion they overheard.

The rankings were analyzed in two ways. First, they were analyzed to determine levels of agreement among the participants as to what was said and agreed upon at the meetings. Thus, each overhearer's ranking was intercorrelated with the rankings of other participants who had overheard the same discussion. Second, the rankings were analyzed to determine the degree of influence of the dominant and the nondominant speakers in the original discussion. Thus, each overhearer's ranking was correlated with the rankings of the dominant and the nondominant speakers in the original meetings. The R values from these analyses were then transformed into r' values for the analyses we report.

Results and Discussion

The results confirm the predictions of the audience-design account. Compared with participants who overheard small groups, participants who overheard large groups exhibited higher levels of agreement among themselves as to the relative importance of the issues in the original discussions. Furthermore, they agreed more strongly with the dominant than the nondominant speaker in the discussion.

First, we consider the results in terms of the consistency of overhearers' rankings. Figure 4a shows the average agreement (r') of overhearer's rankings. It can be seen that agreement as to the relative

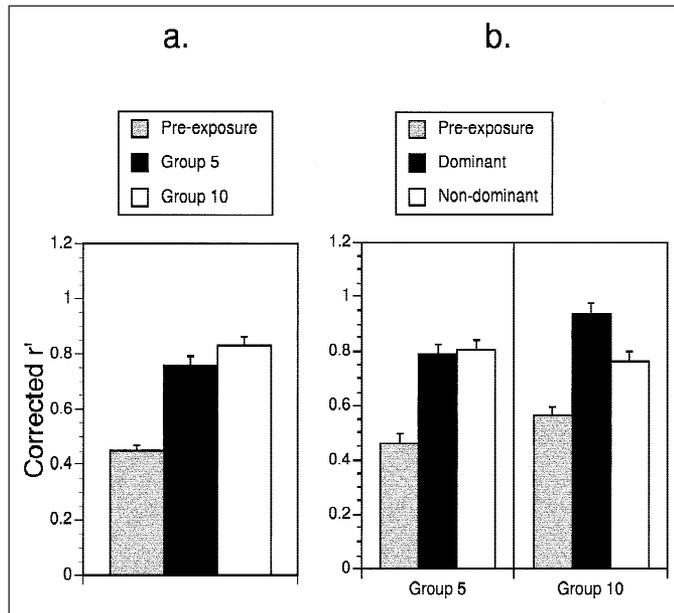


Fig. 4. Results from Experiment 2. The average level of postexposure agreement on issue rankings among participants who overheard 5-member and 10-member group discussions is shown in (a). Overhearers' postexposure agreement with the dominant and the nondominant speakers' rankings (from Experiment 1) is shown in (b). Preexposure levels of agreement are shown as a baseline.

importance of the issues discussed was stronger when participants overheard groups of 10 as compared with groups of 5. These data were entered into an ANCOVA with size of overheard group as a within-subjects factor and preexperiment r' values entered as the covariate. This analysis revealed a reliable main effect of group size, $F(1, 98) = 7.4$, $MSE = 0.03$, as predicted.

Next, we consider the results in terms of the influence of the dominant as compared with the nondominant speaker on overhearers. The average agreement (r') between overhearers and the dominant and nondominant speakers in the discussion overheard is shown in Figure 4b. It can be seen that participants were influenced strongly by the dominant speakers when listening to discussions of large groups, but there was no such influence of the dominant speaker when participants listened to small-group discussions.

Each participant's agreement (r') with the dominant and the nondominant speakers was entered into a 2×2 ANCOVA with group size and dominance as within-subjects factors and with preexperiment agreement (r') as the covariate. The ANCOVA showed a reliable main effect of dominance, $F(1, 98) = 9.96$, $MSE = 0.05$, as well as a reliable interaction between dominance and group size, $F(1, 98) = 19.43$, $MSE = 0.05$. The interaction was due to the effect of dominance for the groups of 10, $F(1, 98) = 23.29$, with no effect for groups of 5 ($F < 1$).

GENERAL DISCUSSION

At the outset, we made the point that most complex decisions arise out of group discussion (Dunbar, 1996). The results of the experiments reported here highlight the role of communication in such decision making. Group members engaged in the complex decision of

establishing recommendations about the plagiarism scenario were influenced quite differently in small and large groups. In the small, interactive groups, they were influenced most by the group members with whom they interacted. In the large, less interactive groups, they were influenced most by the dominant speaker in the group.

From a theoretical point of view, the results point to two quite different modes of face-to-face communication in small and large groups. In small groups, it is a bilateral process of establishing consensus among pairs of communicators. In large groups, it is a unilateral process of broadcasting information to the group at large. The second experiment indicates that the two processes arise from speakers designing their utterances for different audiences. Speakers in large groups formulate what they say to be understood by the wider audience, whereas speakers in small groups are sensitive only to their current conversational partner.

The results also have practical consequences for real-life decision making. They suggest that the size of a decision-making group influences what the group can achieve. If it is important to take into account the range of opinions among group members, then small groups should perform better. However, if the goal is to disseminate a particular opinion through a dominant group member (e.g., the leader of a team), then large groups should be more effective.

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APPENDIX

The following scenario involving a student's plagiarism was used as the basis of group discussion in Experiment 1.

In 1978 Martin Cook was a journalism student in his final year at Glasgow University. Throughout his years at the university Martin showed an excellent academic record. Indeed, Martin's previous coursework and examination grades left him in the position of being a borderline first/upper second class degree student as he entered his final year.

Taking an active role in the debating society and being a frequent contributor to the university newspaper Martin was held in high esteem by the majority of academics in the English department.

The high quality of Martin's final year creative writing thesis (worth 20% of his final degree classification) would have ensured him a first class honours degree if it were not for the scrupulous second marking given by his external examiner. The external examiner, an expert in American literature, discovered that Martin had plagiarised the work of a little-known American writer.

As a member of the university senate it is your job to discuss the issues you believe to be most important to this case and recommend that these issues be

considered by the select committee responsible for the final decision concerning the most appropriate disciplinary action to be taken (verbal warning, suspension, expulsion etc.).

For the ranking task, participants were given a sheet with the following list of issues:

- University responsibility to the individual student (Martin)
- Consideration of Martin's extra-curricular activities
- Martin's reasons for cheating
- University responsibility to other non-plagiarising students
- Quality of Martin's previous work
- University policy on plagiarism
- Extent of plagiarism
- Reaction to being caught (e.g., own up or deny it)
- The fact that Martin was a borderline first/upper second class degree student
- Plagiarism as being a more serious offence in journalism and therefore should be more heavily punished
- Consideration of the possibility that many people plagiarise to some degree and do not get caught
- Feelings of academics and tutors familiar with Martin as to the appropriate punishment
- Consideration of examination results (assumes that students cannot plagiarise in exams)